

REMARKS

Applicants have the following response to the Office Action of February 10, 2006.

Applicants will address each of the Examiner's rejections in the order in which they appear in the Office Action.

Claim Rejections - 35 USC §103

Claims 6-10, 12, 13

In the Office Action, the Examiner rejects Claims 6-10, 12, 13 under 35 USC §103(a) as being unpatentable over Tu et al (US 5,714,285) in view of Yamanishi et al. (US 5,626,727). This rejection is respectfully traversed.

More specifically, the Examiner contends that Tu discloses the process of forming a film for photomask blank comprising setting a substrate in a horizontal position where a surface of the substrate and a surface of a sputtering target are in opposed positions with a center axis of the target deviating from the center axis of the substrate (citing Fig. 5 and col. 4, lns. 4-35 in Tu). The Examiner admits that Tu does not disclose rotating the substrate around its center axis, as in independent Claim 6. The Examiner, however, contends that Yamanishi teaches rotating substrate holder when opposed to targets offset from the axis of the substrate and angled thereto (citing col. 7, lns. 17-31). Thus, the Examiner argues that it would be obvious to modify Tu with the rotating substrate holder of Yamanishi to arrive at the method of independent Claim 6.

While Applicants disagree and traverse this rejection, in order to advance the prosecution of this application, Applicants are amending independent Claim 6 to state that the rotation of the

substrate is controlled so as to make the rotation number during the film formation an integer.¹ The feature is supported by, for example, page 18, line 27 to page 19, line 11 in the specification of the present application. In other words, the rotation of the substrate is strictly controlled so as to not have a fraction in rotation number, such as 1.2 or 1.5.² This feature is not disclosed or suggested by either Tu or Yamanishi, nor would this feature have been obvious in view of these references.

In particular, the present inventors have discovered that by the claimed feature of controlling rotation, significant advantages are obtained. It is fairly known to control the sputtering only by the time. As the Examiner pointed out in the Office Action, sputtering time could be decided up to the desired thickness of the film to be formed. However, the present inventors have determined that controlling only the time is not a sufficient factor to achieve extra uniform film thickness, as for a specific use such as photo mask blank. The inventors have determined that if the rotation number of the substrate is not an precise integer, fluctuation in the film thickness still occurs. It was also determined that if the rotation speed is substantially fast to make the number of rotations greater, the fluctuation of thickness might be minimized, but in such the case, undesired particles (or dust) would be generated during the sputtering process. This very likely will lead to deteriorate of the quality of the film, particularly in a field of extreme precision such as photo mask blanks.

The method of the claimed invention, however, does not require such the quick rotation (and does not have the resulting undesired particle generation), but still achieves satisfactory film

¹ Applicants are also canceling Claims 8 and 10 without prejudice or disclaimer in order to advance the prosecution of this application.

² Preferably, as is set forth in new Claim 26, see *infra*, the position detection is carried out to make the rotation number an integer. This is also supported by, for example, page 18, line 27 to page 19, line 11 of the specification. This features is also not suggested by either Tu or Yamanishi.

uniformity. This is done in the present invention even without the necessity of the use of the plurality of the targets as disclosed in the cited references. This benefit and result are not taught or suggested in either of the cited references. Hence, not only is this feature not disclosed or suggested by either cited reference, but there is no realization of this benefit or result in the references, and as a result, no suggestion in the references which would lead one skilled in the art to this claimed feature.

Accordingly, even if the references are properly combinable (which Applicants do not admit), the combination fails to disclose or suggest the claimed method of amended independent Claim 6. Therefore, independent Claim 6 and those claims dependent thereon are patentable over the cited references, and it is respectfully requested that this rejection be withdrawn.

Claims 14-16

The Examiner rejects Claims 14-16 under 35 USC §103(a) as being unpatentable over Tu et al. in view of Yamanishi et al. and further in view of Mitsui et al. (US 5,955,223). This rejection is also respectfully traversed.

Each of these claims is a dependent claim. Therefore, for at least the reasons discussed above for the dependent claims, each of these claims is also patentable over the cited references. Accordingly, it is respectfully requested that this rejection be withdrawn.

New Claims

In order to further claim the present invention, Applicants are adding new Claims 26-36. No new matter is being added.

New independent Claim 28 recites the feature of an angle formed by the substrate and the

target, and that such angle is between 10 to 15 degrees. This feature is supported by, for example, page 20, lines 11 to 15 and the Examples in the specification of the present application. The present inventors have determined that by employing such a relatively small angle, a satisfactory uniform film is obtained, even without use of the plurality of the targets. In contrast, Tu is silent as to the angle formed by the substrate and target, and Yamanishi teaches to apply a substantially greater angle (e.g. 45 degrees in the Examples). Hence, this claimed feature of the present invention is also not taught by either reference, and independent Claim 28 is patentable over these references.

New independent Claim 33 sets forth conditions by which phase angle distribution within $\pm 2^\circ$ and transmittance distribution within $\pm 4\%$ of an average value are obtained, as is shown in Fig.9 of the present application. Such feature and the benefit therefrom are not taught or suggested in any of the cited references, and independent Claim 33 is also patentable over these references.

Accordingly, it is respectfully requested that these new claims be entered and allowed.

If any fee should be due for these new claims, please charge our deposit account 50/1039.

Information Disclosure Statement

Applicants filed an information disclosure statement (IDS) on May 24, 2006. It is respectfully requested that this IDS be entered and considered prior to the issuance of any further action for this application.

One of the references cited in the IDS is Baldwin (USP 6,419,802). This reference was cited by an Examiner in another application by Applicants. The Examiner in the prosecution of that case cited such the reference for its disclosure as to a sensor for detection. As to this respect, Applicants note that Baldwin's sensor is for detecting the thickness, during the ongoing deposition, and for

increasing or slowing the rotation speed up to the detected thickness. The issue of whether the rotation number is an exact integer or not does not appear to be disclosed or suggested in Baldwin, or of any concern to Baldwin. Hence, the claimed method of the present application is patentable thereover.

Conclusion

For at least the above-stated reasons, the present application is in a condition for allowance and should be allowed.


If any further fee is due for this amendment, please charge our deposit account 50/1039.

Favorable reconsideration is earnestly solicited.

Respectfully submitted,

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